THE NETPLEX

IT'S A NEW SILICON VALLEY

The world's most important growth industry links everywhere to everywhere. But the people building the electronic highway work just down the road from one another. ■ *by Thomas A. Stewart*

AMERICA'S hottest industry has staked out a place on the map. New York was Radio City; so many machine-tool makers once lined the banks of the Black River in Springfield, Vermont, that the area was known as Precision Valley. Some businesses get married to a place and take its name: Detroit, Hollywood, Savile Row, Wall Street. But with all the horn blowing that goes on in Washington, D.C.,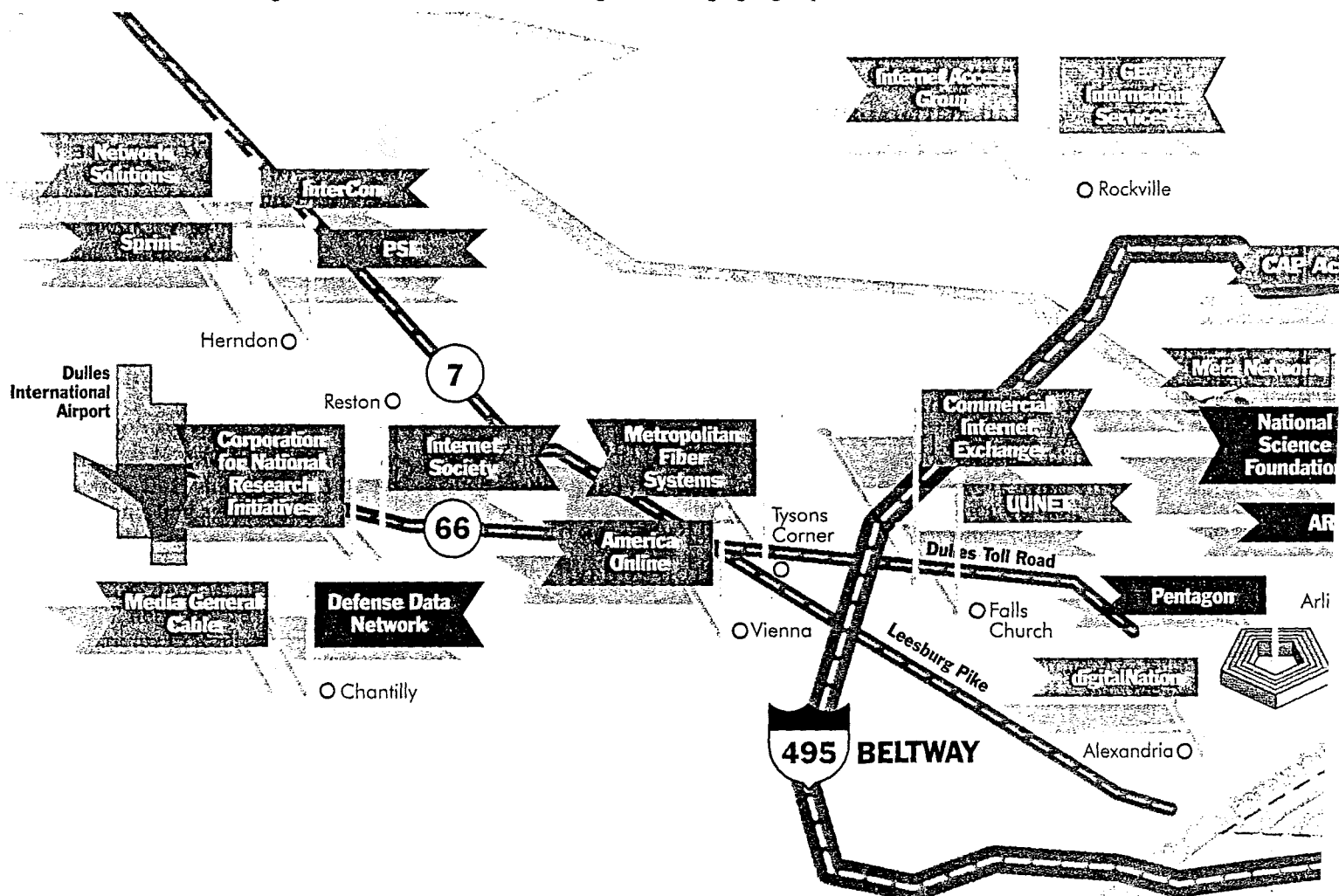 the area's transformation into a great center of technology for the next century has been little noticed, and till now unnamed.

Call it the Netplex. Begin at the Pentagon and draw a line west to Dulles Airport; then north to Rockville, Maryland; east through Maryland to the town of Greenbelt; and back down into Virginia to the Pentagon. Within that area, about 20 miles square—a parallelogram, more like—lies the crossroads of the electronic superhighway.

Washington-area corporations lead the world in building and managing high-speed data communications networks—an industry into which tens of billions of dollars will pour to build an information infrastructure. In the U.S., only Silicon Valley has more high-tech companies. Netplex businesses outnumber those along Massachusetts's Route 128 and leave the Research Triangle of North Carolina eating its own red dust. In the Information Age the importance of the Netplex will only increase. Its companies—many of them obscure now—

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ILLUSTRATION BY TONY MIKOLAJCZYK

could be the AT&Ts or RCAs of the future, their leaders its Theodore Vails or David Sarnoffs.

Netplex businesses inhabit a telecommunications rain forest, grown effulgent in a soil of government contracts and political contacts. As the data highway industry grows, it is creating a formidable lobbying and regulatory challenge. Fundamental values, such as protecting intellectual property, privacy, and free speech, must be restudied for an electronic age.

This region has long been the world center of satellite communications, with Comsat, GTE Spacenet, Hughes, Intelsat, and more orbiting the Washington Monument. Here reside vast federal government data communications networks, such as those operated by NASA and the Defense De-

Number of companies	
Silicon Valley California	**1,845**
The Netplex Washington, D.C., area	**1,206**
Boston and Route 128 Massachusetts	**1,160**
Research Triangle North Carolina	**241**

FORTUNE TABLE / SOURCE: WASHINGTON TECHNOLOGY

partment. The District of Columbia is home to MCI, the second-largest—and most aggressive—U.S. long-distance phone company. In three buildings near Dulles Airport, No. 3 carrier Sprint has its largest concentration of employees outside its Kansas City headquarters.

The local phone company is Bell Atlantic, the pushiest Baby Bell, soon to own cable TV giant Tele-Communications Inc. Northern Telecom's U.S. headquarters is in McLean, Virginia. Half a mile down Lees-
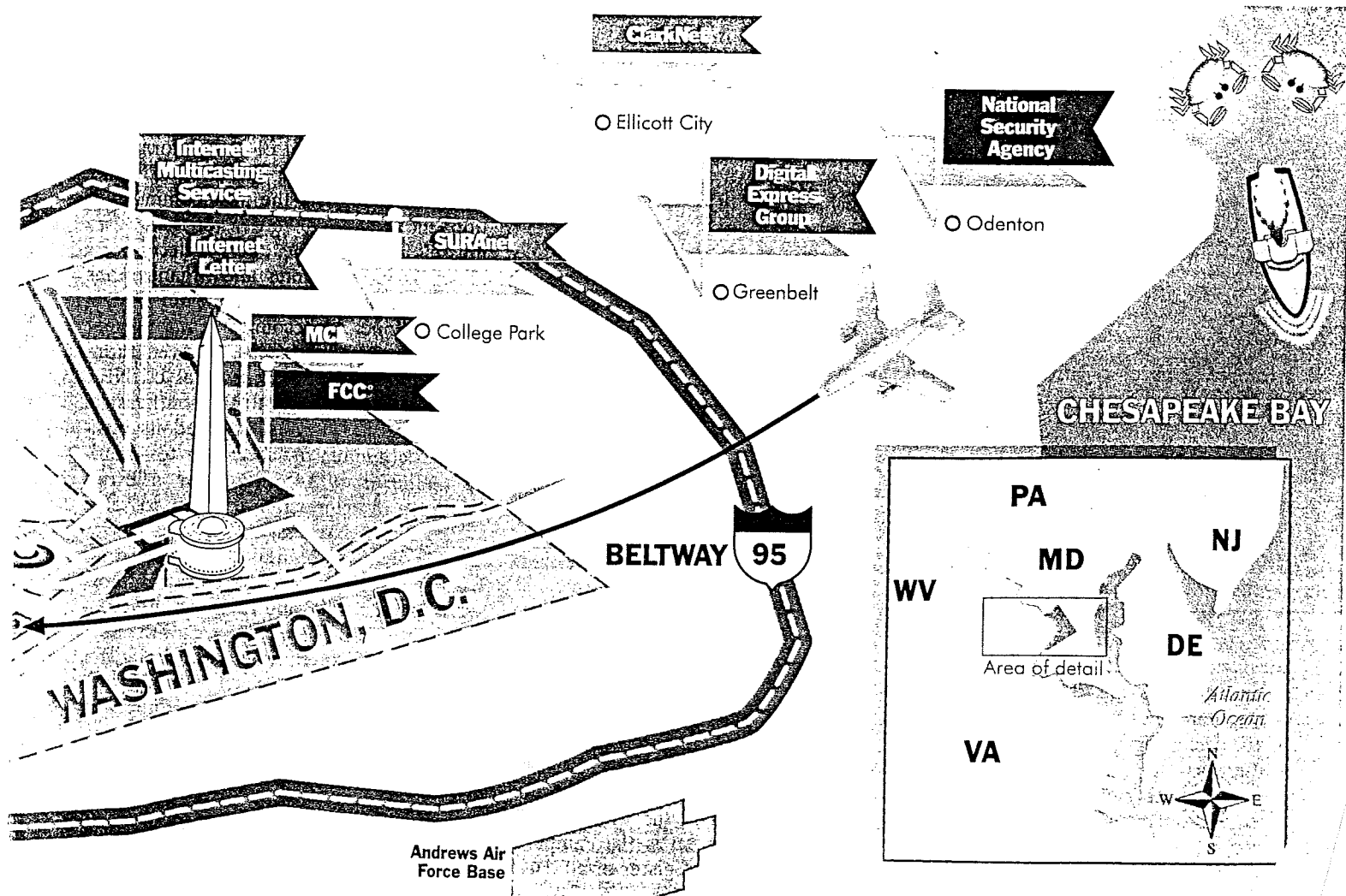
burg Pike, in Vienna, is AT&T Paradyne, a subsidiary that deals in data communications; next to it, American headquarters for Britain's Cable & Wireless PLC, which sells long-distance phone and data services to companies—$507 million on this continent last year. Across the street is the second-biggest office of Metropolitan Fiber Systems, an Omaha company that competes with local telcos to offer access to long-distance service.

The key enterprise in the Netplex is one that most people, even many who are part of it, don't think of as a business at all: the Internet. The Internet takes its name from what it does: It links more than 25,000 computer networks, having some 20 million users around the globe. Many refer to it simply as "the net." Users communicate

A HIGH-TECH CAPITAL

⬛ The area around Washington, D.C., has become the world center of the data communications industry and the focal point of the global Internet. Flagged here in red are the principal (and some of the smaller) businesses of the Netplex: The companies build and manage optical-fiber networks, sell Internet connections to companies and individuals, or offer other services. Blue flags mark important U.S. government data networking operations.

ClarkNet

O Ellicott City

National Security Agency

Digital Express Group

O Odenton

Internet Multicasting Services

Internet Letter

SURAnet

O Greenbelt

MCI   O College Park

FCC

CHESAPEAKE BAY

BELTWAY 95

PA	
MD	NJ
WV	DE
	Area of detail
VA	Atlantic Ocean

Andrews Air Force Base

WASHINGTON, D.C.

via an electronic lingua franca that enables any computer on a network hooked to the Internet to send messages, files, software, and other data to any other computer on the net.

The Internet was created by the Pentagon as a Cold War communications network. It grew to include defense contractors and

While the Internet has no corporate identity, it does have a center of gravity, and the Netplex is it. Says Anthony Rutkowski, the director of Sprint International and a vice president of the Internet Society, a volunteer group that promotes Internet use and helps set its technology standards: "It's uncanny how many of us in the

networks' electronic addresses, as well as a raft of Internet services, software houses and hardware makers, and associations. Well over half of Internet traffic between the U.S. and other nations—hundreds of gigabytes each day—passes through the Netplex.

T HE DATA HIGHWAY industry is as big as you want it to be, depending on how expansively you define it. Defined narrowly, it's just $100 million in annual sales, according to Martin Schoffstall, vice president of Performance Systems International (PSI) of Herndon. Virginia, a supplier of Internet connections. He is counting just the market for selling interorganizational, data-only communications services—E-mail. file transfer. and so on—using the Internet's transmission protocol.

Broaden the definition to include on-line services like America Online (Vienna. Virginia), and the annual revenue stream is about $1 billion. Add another $1.8 billion if you count commercial services such as electronic data interchange. which enables companies that do business with one another to set up automatic purchasing, invoicing, and funds transfer, and whose major participants include General Electric Information Services (Rockville), Sprint, and MCI.

However defined, the data communications industry is growing faster than zebra mussels in a drainpipe. PSI, which connects about 5,000 companies and organizations to the Internet, added 300 accounts in December alone. An account might represent one computer, or dozens, or even thousands. Last year, PSI's archrival UUNET Technologies, 12 miles to the southeast in Falls Church, Virginia, doubled its business. The number of subscribers to America Online grew 145%, putting grievous strain on the company's capacity to serve them. Digital Express, an Internet service that Douglas Humphrey, 34, started in his basement 2½ years ago, had three employees in January 1993 and 15 a year later: revenues grow 10% to 20% a month. Says Humphrey: "The Internet is basically five years old, but in this business you measure time in dog years. Five years from now, the industry won't be recognizable." MCI estimates that by 1998 businesses will spend nearly $40 billion on data communication. more than on voice phone service.

Netplex companies can be put in four groups, though the lines between them blur:

As users flock to the Internet, entrepreneurs like Jamie Clark start businesses to serve them.

universities, and has exploded into general use in the past two years. Its number of users doubles annually, making it the fastest-growing communications medium in history—and the technological proving ground for the electronic superhighway. Already the Internet has given rise to a substantial industry to build and manage its circuits and link up companies, government agencies, universities, and individuals.

Internet business are strung up and down the accessway to Dulles Airport." Here reside the dominant for-profit providers of Internet connections and two of the four biggest on-line services, which offer subscribers E-mail. electronic versions of magazines. access to airline reservations and investment services, and the like. The Internet Society is here; so is the computer that houses the master register of affiliated

■ **PIPELINE OWNERS.** These are companies that build, sell, and rent out high-speed lines; the big players are Sprint, MCI, and Metropolitan Fiber Systems. Each operates fiber-optic networks that carry digital signals at 45 megabits per second, more than 3,000 times the rate of modems in personal computers. Sprint leases circuits to UUNET, America Online, Digital Express, and other Internet companies; a Sprint subsidiary in Herndon transmits 62% of Internet traffic between the U.S. and other nations. Says CEO William T. Esrey: "Our Internet capabilities are unrivaled."

Unmatched, maybe, but not unrivaled. MCI is co-owner (with IBM and Merit Network of Ann Arbor, Michigan) of Advanced Network and Services, which operates the National Science Foundation network (NSFnet), the main line for federal and educational Internet traffic. Prodigy, the on-line service owned by Sears and IBM, runs on MCI lines. In January, MCI scored a coup, hiring Vinton Cerf, 50, the computer scientist who co-authored the basic Internet protocol and who is also president of the Internet Society. At MCI he will develop designs and software for a global communications system called networkMCI, which will let businesses deliver video on demand and other sexy services. Says Cerf: "MCI hopes that when you think Internet, you'll think 'networkMCI.'"

Metropolitan Fiber Systems operates a fiber line that runs between Falls Church, Virginia, and College Park, Maryland. Called the Metropolitan Area Ethernet (and nicknamed MAE-East, with a bow toward film star Mae West), it is arguably the Internet's single most important segment, because it directly connects Sprint, PSI, UUNET, the NSFnet, and the main data line to Europe.

■ **LEASED-LINE PROVIDERS.** This group sells Internet connections, mainly in the form of leased lines, to corporations and other large groups that want to hook their networks to the Internet. They charge $650 to $3,400 a month, depending on the speed and capacity of the connection.

Only six companies offer Internet access nationwide from local access points in many different cities. The three in the Netplex—PSI, UUNET, and Sprint—are by far the biggest. In the Netplex too is SURAnet (College Park, Maryland), a regional lessor linked to MAE-East whose main customers are universities and researchers in the Southeast and Latin America.
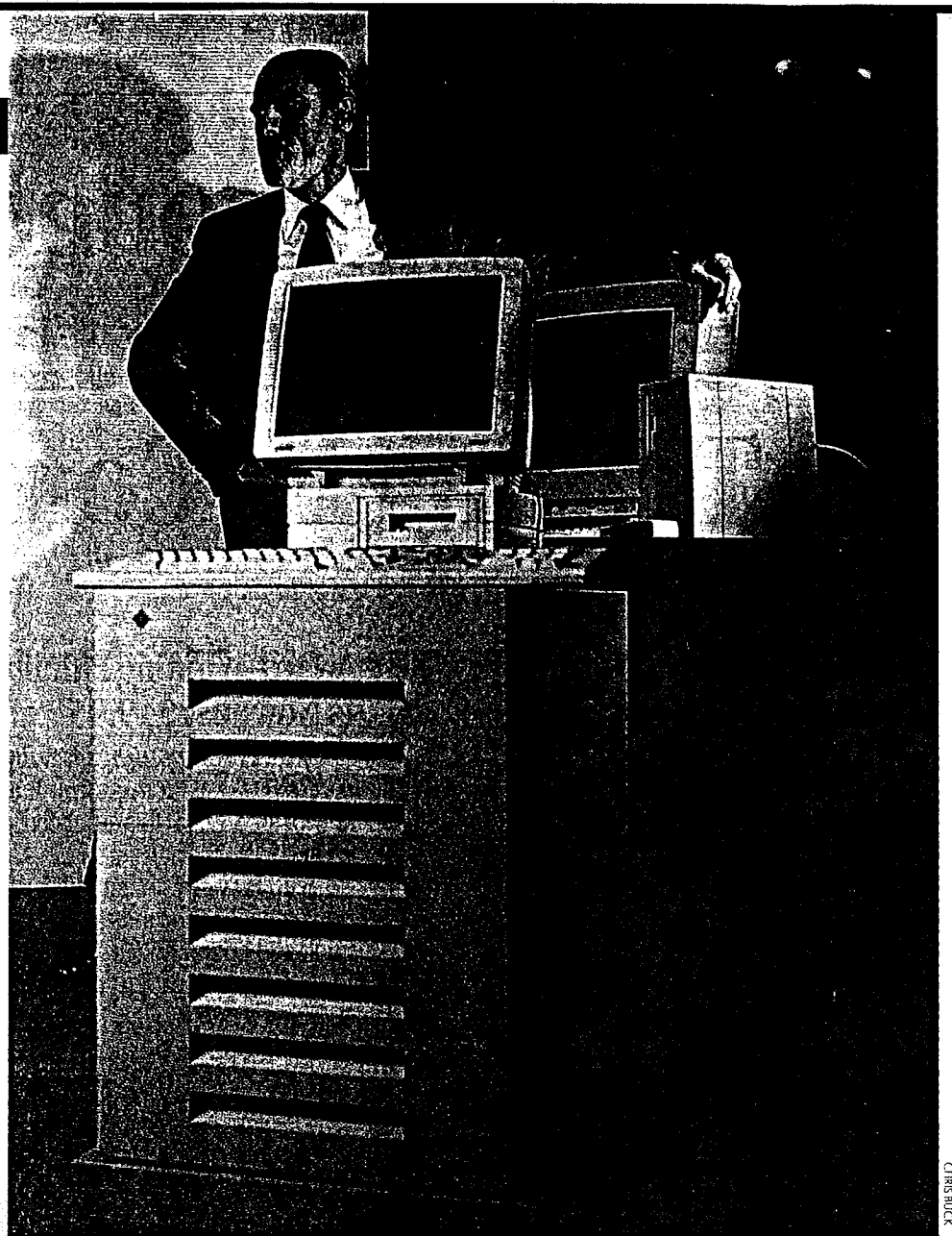
■ Internet mastermind Vint Cerf stands by the computer housing the net's master address list.

UUNET basically invented the business of leasing corporate Internet connections. Richard Adams started with the seismic research network of the U.S. Geological Survey, in Arlington, Virginia; he set up UUNET in 1987 and turned it into a for-profit corporation three years later. PSI founders Schoffstall and William Schrader moved to Virginia in late 1989 from upstate New York, leaving a nonprofit regional Internet service. Says Schoffstall: "We came for access, to make sure our public-policy goals were heard—those being commercialization of the Internet and making sure the playing field isn't tilted toward certain blessed government contractors." The villain, in his eyes and Adams's, is Advanced Network & Services, which they feel had an unfair leg up in its commercial Internet business because it operates the NSF network with government money. ANS and the NSF deny the charge.

PSI and UUNET are roughly equal in size; their principals speak of one another with the mixture of respect and dismissiveness one imagines Westinghouse and General Electric executives displayed a century ago. Adams claims that a third of his customers came from his rival up the road. Says PSI's Schoffstall: "On January 1, 1990, we were the smallest Internet provider. Now we're the biggest." In an industry where it's hard to tell the entrepreneurs from the amateurs, both are building solid management and technical staffs to operate decentralized systems. That's not easy, according to Schoffstall: "The talent base for running distributed networks on a planetary scale is very narrow. You know that airline ticketing is a technical challenge; this business is like airline ticketing on steroids."

■ **DIAL-UPS.** Like the leased-line providers, this group also hooks people to the In-

nternet will be as essential as water, power, phones, sewers, roads— and beer."

ternet but on a smaller scale, concentrating on customers who connect a single computer by means of a modem and ordinary phone line, and pay about $20 a month. The dial-ups are a colorful lot. Take Digital Express founder Doug Humphrey, 6-foot-3 and 275 pounds, an ex-troubleshooter for Tandem Computers with a gargantuan appetite for business. He says, "The Internet is the beginning of the next infrastructure, as essential as water, power, phones, sewers, roads—and beer, probably. I don't know whether a small company can survive the transition." To expand beyond the onesy-twosy business of signing up individuals with PCs, Humphrey is pushing hard into the leased-line market, pitching to government and corporate accounts in the Netplex and New York City. Capital for the expansion will come from Adam Curry, a video jockey on MTV.

Near Baltimore, James Clark, 31, runs tiny ClarkNet from a working barn on his father's farm, where cattle low and modems glow. Clark left an insurance company to found the company last May. He has been deaf since birth, and three of his four partners are hearing-impaired—a disability irrelevant in cyberspace. In addition to ordinary dial-up Internet connections, ClarkNet provides technical support for people whose hearing problems keep them from seeking information by phone.

Meta Network, in Arlington, serves as the electronic home of Vice President Gore's "reinventing government" task force. Using a powerful Dell processor linked to the Internet, the company creates on-line "conference centers" that include electronic bulletin boards, discussion groups, and specialized databases. The Gore task force calls its conference center NetResults. Other customers: the Kennedy Center for the Arts, the American Bar Association, and a group of scientists studying chaos theory. Participants can visit their conference center electronically from any Internet access point in the world, avoiding long-distance charges.

The Netplex also gave birth to another kind of dial-up, the public on-line service. The first, the Source, started in McLean in 1979; it is now part of Compu-

Serve, in Columbus, Ohio. The Netplex is host to two big on-line services, America Online, No. 3 after Prodigy and CompuServe, and GEnie, No. 4, owned by GE Information Services.

On-line services stand a bit apart from the Internet. Because they serve Mammon, they were not allowed to connect to the once wholly noncommercial Internet until 1989, when Vint Cerf persuaded the government to let in commercial E-mail.

■ CAMP FOLLOWERS. The list of those making a living from internetworking in the Washington area could be extended almost indefinitely. Network Solutions (Herndon) manages the military's Defense Data Network (Chantilly, Virginia) and, under contract from the NSF, assigns addresses to networks as they join the Internet. InterCon Systems (Herndon) is the biggest producer of Internet software for Macintosh users. Newbridge Networks (Herndon again) sells more than $230 million a year in networking hardware. Almost invisible in the Netplex are the intelligence community's networks, such as the Financial Crimes Enforcement Network in Vienna, which monitors electronic currency transactions, looking for money launderers.

Amid so many data highway businesses, no wonder Media General Cable of Fairfax, in a survey of households in the Virginia county, found that more than half own personal computers and three-fifths of those have modems. Says vice president of technical operations Michael Nelson: "Three out of ten business cards I get have E-mail addresses."

The Netplex grew in Washington because the federal government is there. It is the biggest buyer of information technology. Feds built the Internet and still subsidize it—though as it has expanded, the subsidized portion of its costs has fallen to below 8%. (By comparison, government payments make up about 5% of farmers' income.)

Moreover, the federal bureaucracy is the world's larg-

est producer of information. Consider the flow of data from the Securities and Exchange Commission alone, which Internet Multicasting Service, in the National Press Building downtown, has started to put on the net: about 140 megabytes per day, more than the entire capacity of a typical personal computer. It's logical that the information distribution business would grow up next to the factory.

The paradox of the Netplex is that this industry, which makes it feasible for computer users to live and work anywhere from Reykjavík to Jakarta, is so highly localized. Jean Villanueva, a vice president of America Online who has worked for GE Information Services and the Source, says, "We all know one another, or know who we are. I keep up with most of the GE folks and a lot of old Source people." Says Carl Malamud, president of Internet Multicasting Service: "We all talk to each other—we have to, because the net is a very complex machine."

When they talk, of course, cybernauts are as likely to share a byte as a meal. Scott Williamson of Network Solutions, who assigns Internet addresses, and Martin Schoffstall of PSI, who requests more of them than any other leased-line provider, work across the street from each other in a small complex of low-rise offices. But they never met until they were on an airplane headed for a conference in Ohio.

All the same, proximity to Washington matters. The government's relative importance as a market will diminish, but not its power to affect the young industry. Says Frank Burns, a Meta Network partner who has painted his Dell 320N notebook with Southwestern Indian designs: "Technically, we could be anywhere, but the real questions aren't technical. They are public policy and social change. It's really important to be here."

The Netplex's enduring advantage as a business center is likely to be its people. The technical and service skills required to run large data networks are scarce, and labor markets work best when people can change jobs without changing mortgages. Washington, predicts America Online President Stephen Case, will be an economic powerhouse in the electronic megaindustry, on a par with New York, Hollywood, and Silicon Valley.

About time the place earned its keep. ■

The Netplex will be a powerhouse, on a par with New York, Hollywood, and Silicon Valley.